Brief, Generic Descriptions of Catalog Items

Residential, Commercial and Industrial (RCI) Technical Working Group

RCI-1 ENERGY EFFICIENCY PROGRAMS, FUNDS, AND GOALS

1.1 Demand-Side Management (DSM)/Energy Efficiency Programs, Funds, or Goals for Electricity (including expansion of same)

This option focuses on increasing investment in electricity demand-side management programs through programs run by utilities or others, energy efficiency funds, and/or energy efficiency goals. These options are typically termed DSM activities, and may be designed to work in tandem with other strategies recommended by the CAT that can also encourage efficiency gains.

The policy design includes two key and linked dimensions: achievable/desirable energy savings and policy/administrative mechanisms to achieve these savings. In order to implement expanded DSM programs, a number of mechanisms should be considered. Candidate mechanisms include revising existing statutes to enable utility investments in energy efficiency at the levels indicated above, to consider as potentially eligible programs that are cost-effective taking into account the valuation of for CO_2 emissions. Policy and administrative mechanisms that might be applied include regulator-verified savings targets, public benefit charges, portfolio standards, "energy trusts," integrated resource planning, performance-based incentives, decoupling of rates and revenues, and appropriate rate treatment for efficiency. Elements that might be considered in designing this option might include:

- Implementation/administration by utility (including municipal utilities and cooperatives), state agency, or third-party actors.
- Subsidized energy audits for homeowners, businesses, industries.
- Low-cost loans for efficiency improvements.
- Incentives for customer-sited renewable electricity and heat including solar photovoltaic (PV), passive solar space heat, and solar water heat (SWH).
- Incentives for specific technologies, potential including (but not limited to) white roofs/rooftop gardens/ landscaping, ground-source heat pumps, lighting, water heating, plug loads, networked personal computer management, power supplies, motors, pumps, boilers, customer-side transformers, water use reduction, and others.
- Appliance recycling/pick-up programs.
- Energy efficiency reinvestment funds to provide funding for efficiency improvements in specific sectors.
- Focus on specific market segments (low income residential, small and medium businesses).

Measures supporting this option might include consumer education, performance contracting, and energy end-use surveys.

Initiative 937 requires that "Each qualifying utility shall pursue all available conservation that is cost-effective, reliable, and feasible."

1.2 Demand-Side Management (DSM)/Energy Efficiency Programs, Funds, or Goals for Natural Gas, Propane, and Fuel Oil (including expansion of same)

This option has most of the same attributes and options for design elements and implementation as option 1.1, but focuses on increasing investment in demand-side management programs related to the use of natural gas, propane (or liquefied petroleum gas—LPG), and fuel oil, through programs run by utilities or others, energy efficiency funds, and/or energy efficiency goals.

1.3 Business Energy Tax Credit

A business energy tax credit can provide incentives for businesses to invest in energy efficiency and/or customer-sited renewable energy systems. Washington lacks an income tax, but has business and occupations taxes, typically on gross receipts, that apply to a number of different categories of businesses; a business energy tax credit would be applied to these taxes[1]. A specific proposal for consideration is to exempt from retail sales taxes those energy savings performance contracting services carried out on public buildings in the state, including schools, universities, community colleges, and state and local government buildings.

Strategies to raise government revenues to support greenhouse gas emissions reduction programs are an important consideration. Tax credits applied to energy efficiency or renewable energy may generate additional government revenues through increased local market activity and job creation, and through re-spending of energy cost savings.

1.4 Regional Market Transformation Alliance

Market transformation alliances use voluntary efforts, typically implemented by non-utility organizations, to encourage greater uptake by consumers (residential, commercial, and industrial, as well as the professionals that service energy-using equipment) of cost-effective energy efficiency practices. A market transformation program is designed to create a situation where the bulk of the private market automatically adopts or incorporates technologies or techniques that result in improved energy efficiency. The goal of a market transformation and technology development program is to put energy efficiency technologies and practices into a position where they will be demanded by the public, chosen by builders and manufacturers, and provided by

[1] The State of Oregon has a program of business energy tax credits applied to business income taxes. Information on Oregon's program is available at http://oregon.gov/ENERGY/CONS/BUS/BETC.shtml.

retailers and contractors. Methods of transformation can be different for each technology or technique, but often revolve around public and private review of quality and effectiveness, including partnerships between government agencies, retailers, manufacturers, and non-governmental agencies. Market transformation programs can be statewide or regional.

Market transformation also seeks to ensure sufficient supplies of technologies and practitioners to meet the subsequent increased demand for energy efficiency.

Potential elements of a market transformation program include:

- Target specific measures, including ground-source heat pumps, solar WH/PV, other technologies important for Washington.
- Target specific market segments (residential low-income, for example, or commercial offices).
- Support for commercialization of promising technologies.
- Bulk purchasing programs (public/private) or arrangements with retailers.
- More aggressive investment with manufacturers, and broader and more aggressive bulk purchasing programs.
- Continued and expanded use of certification programs such as Energy Star by retailers and institutional purchasers.

Consumer education is a significant supporting measure for market transformation programs.

1.5 Public/private Efficiency Funds

"Public/private efficiency funds", possibly implemented statewide, would provide zero- or low-interest energy efficiency loans for both retrofit energy efficiency and new construction energy efficiency, ESCO strategies, modeled after Clinton Climate Initiative Energy Efficiency Building Retrofit Program, and other services (including, for example, support for neighborhood energy strategies), and would be patterned after initiatives in other jurisdictions (Cambridge MA, London UK, and others[2]). These funds would help to provide financing for projects that go beyond energy-efficiency improvements that are cost-effective in today's markets to provide very low or no-carbon goods, buildings, and services. The proposed funds could leverage ongoing innovation in the financial services markets related to climate change and energy efficiency.

[2] See, for example, Cambridge Energy Alliance: http://www.cambridgeenergyalliance.org/ and London Energy Partnership: http://www.london.gov.uk/mayor/environment/energy/partnership-steering-group/index.jsp.

1.6 Appliance/Equipment/Building/Water Performance Requirements Linked to Property Sales (and Rental)

This option would target energy consumption in existing buildings by requiring, when buildings are sold or rented, that heating, cooling, and water heating equipment meet energy efficiency and water consumption performance standards established in building codes in force at the time of sale or rental. Point-of-sale (and rental) ordinances are in place or being considered in San Francisco, Austin (TX), and other cities.

RCI-2 ENERGY EFFICIENCY PROGRAMS, FUNDS, AND GOALS

2.1 Advanced Building Codes for Energy Efficiency

Building energy codes specify minimum energy efficiency requirements for new buildings or for existing buildings undergoing a major renovation. Given the long lifetime of most buildings, amending state and/or local building codes to include minimum energy efficiency requirements and periodically updating energy efficiency codes could provide long-term GHG savings. Implementation of building energy codes, particularly when much of the building occurs outside of urban centers, can require additional resources.

Potential elements of a policy to include building codes include:

- Training of building code and other officials in energy code enforcement.
- Training and Education for Builders and Contractors (for example, in HVAC[3] sizing, duct sealing, and evaluation of building energy efficiency).
- Require high-efficiency appliances in new construction and retrofits.
- Consider basing residential building energy codes for application on a per capita basis rather than per square foot.
- Use the Northwest Power Planning Council's "best of the best" analysis to identify code improvements for Washington.
- Consider requiring PV and passive solar as part of the code in key heating degree zones.
- Consider including natural ventilation strategies in codes.
- Support enforcement of energy codes and/or reestablish special plans examiner program for non-residential energy code.
- Amend rules to add consideration of the GHG impacts of building codes to the State Building Code Council's charter or scope of responsibilities.

Potential measures supporting this option can include consumer and policymaker education, improved enforcement of building codes, development of a clearinghouse for information on and to provide access to software tools to the calculate impact of energy efficiency and solar

[3] Heating, ventilation, and air conditioning.

technologies on building energy performance. This option could also include consideration of the concepts of embodied energy in and "renewability" of building materials[4], and of life-cycle cost analysis of buildings and building components. The inclusion of renewable energy in building codes is also a possibility.

Recent changes in the Washington building energy code are summarized in http://www.energy.wsu.edu/code/code2006.cfm.

2.2 Promotion and Incentives for Improved Design and Construction (e.g. LEED[5], NAHB, Green Globes, Architecture 2030, and other guidelines) in the Private Sector

This policy provides incentives and targets to induce the owners and developers of new and existing buildings to improve the efficiency with which energy and other resources are used in those buildings, along with provisions for raising targets periodically and providing resources to building industry professionals to help achieve the desired building performance. This policy can include elements to encourage the improvement and review of energy use goals over time, and to encourage flexibility in contracting arrangements to encourage integrated energy- and resource efficient design and construction.

Additional Potential elements of this option include:

- Target new, renovated, and/or existing buildings (retrofits).
- Set a cap on consumption of energy per unit area of floorspace for new buildings.
- Encourage building commissioning and recommissioning, including energy tracking and benchmarking.
- Set up a "feebate" program to encourage energy efficiency in building design.
- Provide incentives, in the form of tax credits, DSM program support, financing incentives (such as "green mortgages), or other inducements for retrofit of existing residential and commercial buildings.
- Include encouragement for the use of alternative and local building materials and practices.
- Target reduction of emissions from diesel engines used in new construction developments.

[4] See, for example, CORRIM (Consortium for Research on Renewable Industrial Materials), Life-Cycle Environmental Performance of Renewable Building Materials in the Context of Residential Construction, available from http://www.corrim.org/reports/2005/final_report/index.htm.

[5] Leadership in Energy and Environmental Design; see U.S. Green Building Council, http://www.usgbc.org. Note, however, that LEED is only one of many design standards that could be drawn upon in promoting improved design. Others options include guidelines offered by Architecture 2030 (http://www.architecture2030.org/home.html), NAHB (National Association of Home Builders) Green Homebuilding guidelines, Green Globes (http://www.greenglobes.com/fitup/Non-Flash/index.htm) and SFI (Sustainable Forestry Initiative), and the recognition of the use of CSA-certified wood in construction.

- Encourage capture of waste heat from power generation and industrial processes for use in homes and commercial buildings.
- Encourage improved lighting design, including integrated lighting, daylighting, high-efficiency lighting components, controls (including occupancy sensors, photocells), windows.
- Encourage design that considers energy use in and energy end-uses in buildings in an integrated fashion.
- As possible goals for this option, consider going beyond LEED to Architecture 2030-level goals, providing energy consumption performance (energy intensity) that is 50% of the regional average for each building type.

Potential supporting measures for this option include training and certification of building professionals (see 4.3, 4.4), consumer and primary/secondary education, performance contracting/shared savings arrangements, and setting up of a clearinghouse for information on and access to software tools to calculate the impacts of energy efficiency and solar technologies for buildings. Measures included as a part of this option could also include consideration of concepts of embodied energy in and "renewability" of building materials[6], provision of a business assistance program to help identify and achieve GHG goals, and life-cycle cost analysis of buildings and building components.

2.3 Improved Design and Construction, "Government Lead-by-example"

Recognizing that governments should "lead by example" the option presented here provides energy use targets to improve the efficiency of energy use in State and local government buildings. The proposed policy provides energy efficiency targets that are much higher than code standards for new state-funded and other government buildings. This option sets energy-efficiency goals for the existing government building stock, as well as for new construction and major renovations of government buildings.

In addition to the potential elements noted for option 2.2, most of which also apply here, potential elements of this policy include:

- Municipal Energy Management systems and initiatives, as well as audits of energy performance and operations of State and other government buildings (in tandem with an audit program), Audit results could be used to target and prioritize investments in improving government building energy efficiency.
- Improvement and review of efficiency goals over time, and development of flexibility in contracting arrangements to encourage integrated energy-efficient design and construction.

[6] See, for example, CORRIM (Consortium for Research on Renewable Industrial Materials), Life Cycle Environmental Performance of Renewable Building Materials in the Context of Residential Construction, available from http://www.corrim.org/reports/2005/final_report/index.htm.

- Recommendations that the infrastructure for implementation (meters, bookkeeping systems, staff, etc.) be established as soon as possible.
- State bulk-purchase of appliances and equipment with higher-than-standard energy efficiency for public facilities.
- Establishing "retained savings" policies whereby government agencies are able to retain funds saved by reducing energy bills for further energy efficiency/renewable energy investments or other uses.
- Promote the application of integrated "whole system" or "clean sheet" design (across multiple issues, including issues such as GHG emissions, other pollutant emissions, transport, community planning, and the environmental footprint of materials used.
- Ensure that government procurement processes provide incentives to construct high-performance buildings.
- Require consideration of greenhouse gas emissions, and of options to reduce emissions, where and when government environmental review of projects takes place.
- Meet Architecture 2030, LEED platinum, or other suitably aggressive goals for specific fractions of new and/or existing government-owned buildings by specific target years.
- Provide incentives for improvement of building energy efficiency in government-leased space.
- Encourage improved lighting design, including integrated lighting, daylighting, high-efficiency lighting components, controls (including occupancy sensors, photocells), windows.
- Include green power goals for state buildings.
- Address lack of funding for design of energy-efficient/low-GHG emission state facilities and university campuses
- Require bicycle storage, locker rooms and showers for all facilities to encourage use of no-fossil-fuel commuting.
- Locate government facilities within Urban Growth Area as first priority, in areas well served by public transportation, bike lanes, paths or trails and for UGA-sited facilities achieving minimum LEED Gold ND or similar target building certification level. Consider location to be part of a building's GHG "footprint".

Potential supporting measures for this option are also similar to those for option 2.2, including training and certification of building sector professionals (see 4.3, 4.4), and performance contracting/shared savings, but could also include surveys of government energy and water use, energy benchmarking, measurement, and tracking programs for municipal and state buildings.

2.4 Support for Energy Efficient Communities Planning, "Smart Growth"

"Smart Growth" aims to create communities that are, among other attributes, livable, designed for reduced use of energy both within homes and businesses and in the transport sector, and have a reduced environmental impact relative to typical developments. Variants on the smart growth concept exist, but many call for clustering living units with easy access (often walking distance) to shops, schools, and entertainment and recreational facilities, incorporating elements of energy-efficient design and renewable energy in buildings, sharing energy facilities between buildings (for example, district heating systems), and preserving open spaces. See, for example, http://www.epa.gov/smartgrowth/about_sg.htm for additional information about Smart Growth.

Other potential elements of this option include:

- The conditioning of approval of hook-ups to city, county and utility services upon GHG emissions reduction plans.
- Administrative changes to enhance integrated design of communities and transport systems.
- Measures to reduce urban "heat island" effects through integrated strategies, including - green roofs, white roofs, plantings.
- Reinforce importance of Growth Management, conservation easements linked to Transfer of Development Rights.
- Implement or adjust hookup fees for new developments to provide incentives for smart growth.
- Move from State Dept. of Transportation to State Department of Urban, Rural, and Regional Mobility.
- Establish State Department of Urban Design.

Smart growth policies may include many of the potential design elements and supporting measures noted above for options 2.2 and 2.3.

2.5 Establish Goals, Policies and/or Codes to Reduce Electricity Use for Heating/Drying

Producing heat by burning natural gas directly to dry clothes or cook food is nearly 100% efficient, and natural gas boilers and hot water heaters are typically 80 to 90% efficient, depending on the size and type. Relative to electric resistance heaters or dryers using electricity generated in natural gas-fired power plants (which are at most 55 to 60% efficient) and coal-fired power plants (40 to 45% efficient), the use of natural gas or propane instead of electricity in these end-uses reduces greenhouse gas emissions. This option would provide goals, policies, and/or codes to encourage the conversion of existing electric resistance heating loads, where applicable and practical, to equipment fueled with natural gas or a similar fuel.

2.6 Energy Efficiency Improvement in Existing Buildings, with Emphasis on Building Operations

Existing buildings will continue to use the bulk of the energy used in the residential and commercial sectors in Washington for many years. This option would promote and provide incentives for the improvement of the energy efficiency of the existing building stock. Key to reducing energy use and GHG emissions in existing buildings are building operations, maintenance, and occupant behavior (for example, via total resource management systems). This option could include:

- Requirements for upgrading the energy efficiency of buildings at the time of resale.
- For any medium to large business or agency, requirement that a full time resource conservation manager be located on the premises.

2.7 Reduction of Water Use

Provision of water to, and treatment of wastewater from, homes, businesses, institutions, industries and related facilities, requires energy and, indirectly and (in the case of wastewater treatment) directly produces greenhouse gases. Strategies to reduce water use and related energy consumption for water provision and treatment, including water-conserving appliances, reuse of "greywater", can reduce water and energy use. This option has possible linkage to the Agriculture and Wastes TWG.

2.8 Low Income Energy Programs

Establish a general fund to supplement the state's weatherization assistance program and low-income home energy assistance program. The fund would provide low-cost energy efficiency measures and energy education to eligible households, provide the means to purchase and install high-efficiency heating systems and other high-efficiency appliances to eligible households, and would provide for increased participation in the weatherization assistance program.

RCI-3 APPLIANCE AND EQUIPMENT (INCLUDING LIGHTING) STANDARDS

3.1 More Stringent Appliance/Equipment/Lighting Efficiency Standards

Appliance, equipment, and lighting efficiency standards reduce the market cost of energy efficiency improvements by incorporating technological advances into base appliance and equipment models, and lighting devices, thereby creating economies of scale. Appliance/equipment/lighting efficiency standards can be implemented at the state level for appliances and other devices not covered by federal standards, or where higher-than-federal

standard efficiency requirements are appropriate.[7] Regional co-ordination for state appliance/equipment/lighting standards can be used to avoid concerns that retailers or manufacturers may (1) resist supplying equipment to one state that has advanced standards or (2) focus sales of lower efficiency models on a state with less stringent efficiency standards.

Potential elements of an efficiency standards policy include:

- Establishment and enforcement of higher-than-federal state-level appliance, equipment, and lighting standards (or standards for devices not covered by federal standards).
- Provide support for the development and implementation of higher federal-level efficiency standards.
- Joining with other states in adopting higher standards.
- Requiring high-efficiency appliances in new construction and retrofits.
- Working with national and other manufacturers to encourage them to invest in the production of higher-efficiency appliances and equipment, and lighting devices, and to help to create markets for the higher-efficiency devices.
- Consumer education (see below) is a potential supporting measure for this option.
- In formulating more stringent standards, consider potential shifts in the use of toxic materials (such as mercury in fluorescent lamps) that could inhibit consumer demand for the efficient appliances and create costly disposal issues. For example, efficiency standards policies could be linked to manufacturer "takeback" requirements, toxics reduction standards, or incentives for development and use of non-toxic technologies. The impacts of higher efficiency standards on lower-income consumer groups should also be considered.

3.2 Ban the Sale of Incandescent Bulbs

This option would ban the sale of incandescent light bulbs in the state by the year [2012].

RCI-4 EDUCATION AND OUTREACH

4.1 Consumer Education Programs

The ultimate effectiveness of emissions reduction activities in many cases depends on providing information and education to consumers regarding the energy and GHG emissions implications of consumer choices. Public education and outreach is vital to fostering a broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the state's citizens. Such awareness is necessary to engage citizens in actions to reduce GHG emissions in their personal and professional lives. Public education and outreach efforts should integrate with and build upon existing outreach efforts involving climate change and

[7] In recent years, Arizona, Oregon, and Washington, among other states, adopted state standards for several appliances; this led to the inclusion of standards for these appliances in the 2005 federal Energy bill.

related issues in the state. Ultimately, public education and outreach will be the foundation for the long-term success of all of the mitigation actions proposed by the Washington CAT, as well as those that may evolve in the future.

Potential elements of consumer education programs include:

- Truth-in-advertising campaign
- In-home energy displays
- Provide tools and information for residents, businesses and communities to perform GHG inventories, and to evaluate and act upon inventory results.
- Linkages of consumer education programs with retail sales organizations.
- Require retail education (that is, on packaging or on a handout provided at the time of purchase), that will inform consumers about the energy consumption of the products they buy and how to operate or use the products in the most energy efficient manner.
- Engage community leaders and community-based organizations (for example, institutions, municipalities, service clubs, businesses and business organizations, social and affinity groups, non-governmental organizations, and others) to recognize leadership; share success stories and role models; and expand climate involvement and participation within communities.
- Use existing models for education of businesses in the environmental impacts of their activities to have state agencies/local governments promote improvements within small business sectors and trade associations.
- Engage industrial firms to promote LEAN manufacturing techniques and other practices to reduce unnecessary energy and material consumption.

4.2 Energy Efficiency and Environmental Impacts Awareness in School Curricula

The long-term effectiveness of emissions reduction activities depends on providing information and education not only to present consumers, but to future consumers as well. This policy option involves the education of primary and secondary school students regarding the energy and GHG emissions implications of consumer and societal choices. Public education and outreach is vital to fostering a broad awareness of climate change issues and effects (including co-benefits, such as clean air and public health) among the state's young citizens. As with adult consumers, public education and outreach efforts should integrate with and build upon existing outreach efforts involving climate change and related issues in the state. Preparation of new curricula, including concepts of integrated design for buildings and communities, would likely be a part of this option.

4.3 Post-secondary Specialist Education and Certification for Building Energy Efficiency Experts and Related Trades

In order to effectively implement buildings-related and other GHG-reduction policies, specific and targeted education, outreach, and licensing requirements will be required for professionals in a variety of building-related trades in order to ensure that those professionals have the expertise to support aggressive State building energy efficiency policies.

Potential elements of this policy include:

- Training of building code and other officials in energy code enforcement.
- Training and education for builders and contractors (for example, HVAC sizing, duct sealing, and incorporation of renewable energy systems into buildings).
- Energy management training and training of building operators.
- Continuing education programs and/or requirements for building professionals.
- Establishment or extension of professional licensing requirements related to energy efficiency and/or GHG emissions assessment.
- Targeted community college/university programs (see below).
- Establishment of integrated design programs.

Implementation of the policy could begin with investment in a pilot program or programs at one or two leading schools – such as UW and/or WSU.

4.4 Post-secondary Specialist Education and Certification for Building Energy Efficiency Experts and Related Trades

This policy would encourage and support the creation and/or expansion of post-secondary programs designed to increase the capacity of the States' engineers, architects, technicians, and others in building energy and related trades to implement GHG emissions mitigation activities. These programs could be established/expanded at the community college, college/university, and post-graduate levels, and could cover topics ranging from performance and interpretation of energy audits and installation of energy-efficiency measures and renewable energy systems to design of low- or "net zero" emissions buildings and low-GHG/integrated community design.

Implementation of the policy could begin with investment in a pilot program or programs at one or two leading schools – such as UW and/or WSU.

RCI-5 PRICING AND PURCHASING

5.1 Green Power Purchasing for Consumers

Green power purchasing comprises a variety of consumer-driven strategies to increase the production and delivery of low-GHG power sources, above and beyond levels achieved through Renewable Portfolio Standards and other mandatory programs, such as the existing Washington requirement that the largest utilities offer a green rate tariff (RCW 19.29A.090).

Possible elements of green power programs include:

- A definition of what power sources qualify as green power source by a relevant authority.
- Regulatory encouragement for utilities to develop green power tariff structures.
- Implementation of regulatory requirements that power sources and emissions data be reported in consumer utility bills.
- State goals or mandates for green power purchases, or for the renewable fraction of standard purchased electricity, that would apply to all non-federal government buildings, including local government buildings, public schools, and public universities. This could also be a part of State "Lead-by-example" programs.
- Promotion by the State and/or other entities of voluntary purchasing of green power through provision of information and promotional materials.
- Create statewide stakeholder advisory group to monitor utility green power programs, share information, and coordinate marketing if appropriate.

5.2 Net-metering for Distributed Generation and Combined Heat and Power

This policy option involves the consideration and adoption by state regulatory authorities of rate designs, coupled with the necessary metering technology, that promote reduction in GHG emissions by encouraging consumers to install distributed generation systems—especially those based on renewable fuels—and combined heat (and or cooling) and power systems that offer the opportunity to improve the overall efficiency of fuel use.

Potential elements of this option include:

- Review existing net-metering policies in Washington (Chapter 80.60 RCW), including policies that affect electricity consumers who install on-site combined heat and power or distributed generation fueled with renewable or fossil fuels. Consider the impact of NO_x and power factor requirements on net-metering and availability of information for small customers. Consider increasing the current net-metering cap from 25 kW to 1 MW, and allow aggregation if appropriate in commercial and/or agricultural applications.
- Review rate issues, including decoupling of utility revenues from sales, and consider a specific focus on the impacts of rate design on greenhouse gas emissions. This could include an exploration of the impacts of time-of-use rates on GHG emissions.
- Review and consider utility and other technical rules related to the interconnection of consumer-sited power sources to the electricity grid to assure that they offer equitable treatment of potential distributed generation hosts while providing adequate safeguards for the public and for power sector workers.
- Eliminate/reduce financial, regulatory, and other barriers to implementation of systems.
- Simplify and standardize permitting and prescreening of projects.

5.3 Rate structures and Technologies to Promote Reduced GHG Emissions (including Decoupling of Utility Sales and Revenues)

This option, which is more general than 5.2 above, could include various elements of utility rate design that are geared toward reducing greenhouse gas emissions, often with other benefits as well, such as reducing peak power demand. The overall goal is to revise rate structures so as to better reflect the actual economic and environmental costs of producing and delivering electricity as those costs vary by time of day, day of the week, season, or from year to year. In this way, rates provide consumers with information reflecting the impacts of their consumption choices.

Potential elements of this option include:

- Time-of-use rates, which typically price electricity higher at times of higher power demand, and thus better reflect the actual cost of generation. Time-of-use rates may or may not have a significant impact on total GHG emissions, but do affect on-peak power demand and thus both the need for peaking capacity and fuel for peaking plants. Puget Sound Energy has operated a pilot TOU rate program.
- Tiered (increasing block) rates for electricity and natural gas use, which provide affordable base usage rates for consumers, but which increase with increasing consumption.
- "Smart metering"—implementation of consumer meters showing real-time pricing, and the level of GHG emissions related to consumption at any given time. Smart meters are described as providing consumers with the information needed to make consumption choices, and can include the capability for consumers to adjust the type of power (for example, "green" versus conventional power) "on the fly".
- Different types of rate structures and bases for rate structures, including rates based on the number of occupants of a home rather than its size.
- Rate structures and utility cost recovery rules that "decouple" the level of utility sales from the net revenues earned by utilities. Decoupling mechanisms have been implemented or are under consideration in a number of western states.

5.4 Bulk Purchasing Programs for Energy Efficiency or Other Equipment

Bulk purchasing of appliances and equipment with higher-than-standard energy efficiency by public agencies, and for the organization of similar bulk-purchase programs in the private sector, is a policy option that can augment or be a part of DSM, market transformation, or State Lead-by-example programs. In this option, a government or non-governmental organization purchases large quantities of energy-efficiency products (such as high-efficiency refrigerators or office equipment, or solar water heaters) and/or services (such as home weatherization services) at a bulk price. The organization then either uses the purchased items and services internally, or sells them at an attractive price to other buyers. Bulk purchase programs can help to rapidly develop markets for energy-efficiency or low-GHG goods and services.

Potential elements of this option include:

- Municipal or State government programs, possibly including training in the use of existing bulk-purchasing tools[8].
- Programs for schools.
- Private-sector programs (possibly in coordination with market transformation programs).
- Offer sales tax exemption for all companies that purchase Energy Star equipment and appliances in bulk (target market is hotels, chains, large companies, private universities and colleges, large commercial building developers)

5.5 Sales Tax Credits

Eliminate sales tax for certain energy-efficient products certified as Energy Star® by the U.S. Department of Energy or Environmental Protection Agency. Increase taxes for products with energy use efficiencies below specific minimum baselines.

RCI-6 CUSTOMER-SITED DISTRIBUTED ENERGY AND COMBINED HEAT AND POWER

6.1 Provide Incentives to Promote and Reduction of Barriers to Implementation of Renewable Energy Systems

Distributed electricity generation sited at residences and commercial and industrial facilities, and powered by renewable energy sources (typically solar, but also wind, small hydroelectric power sources, or biomass or biomass-derived fuels), displaces fossil-fueled generation and avoids electricity transmission and distribution losses, thus reducing greenhouse gas emissions. This policy can also encourage consumers to switch from using fossil fuels to using renewable fuels in applications such as water, process, and space heating, as well as to supply new energy services using fuels that produce low or no GHG emissions. Increasing the use of renewable energy applications in homes, businesses, and institutions in Washington can be achieved through a combination of regulatory changes and financial incentives.

Potential elements of this option include:

- Solar roofs (roofing materials with built-in solar photovoltaic cells, or solar PV panels erected on roofs).
- Solar water heating/space heating systems.

[8] For example, the EnergyStar bulk purchasing tool—developed by the U.S. Department of Energy, in collaboration with the Department of Housing and Urban Development and the U.S. Environmental Protection Agency—is designed to make it easy to comparison shop for energy-efficient products. The tool provides a simple way to obtain bids on EnergyStar-qualified products such as appliances, compact fluorescent light bulbs, and light fixtures.

- Wind power systems, particularly for rural areas.
- Biomass-fired generation, space, or water heating systems.
- Programs targeted at specific customer sectors (residential, commercial, industrial), or specific markets within sectors.
- Tax credits, and/or utility or other incentives to lower the first cost of distributed energy systems to users. This could include expanding incentives offered under the existing law to residential consumers to include commercial systems, offering B&O tax credits for commercial-scale systems, and offer low- or no-interest loans for commercial and residential systems.
- Simplify and standardize permitting for industrial and large commercial DG systems. Support County and city land use prescreening efforts to support siting.
- Address lack of funding for design of renewable energy systems associated with state facilities and university campuses

Potential supporting measures for this option include training/certification of installers/contractors, net metering and other pricing arrangements, interconnection standards, and creation/support of markets for biomass fuels.

6.2 Provide Incentives and Resources to Promote and Reduction of Barriers to Combined Heat and Power (CHP, or "cogeneration") and Waste Heat Capture

Combined heat and power (CHP) systems reduce fossil fuel use and greenhouse gas emissions, both through the improved efficiency of the CHP systems, relative to separate heat and power technologies, and by avoiding transmission and distribution losses associated with moving power from central power stations that are located far away from where the electricity is used. Implementation of CHP systems by residential, commercial, institutional, and industrial energy consumers could be encouraged through a combination of regulatory changes and incentive programs.

Potential elements of this option include:

- Promotion of the use of gas-fired CHP systems
- Promotion of the use of biomass-fired CHP systems
- Creation/expansion of markets for, and incentives designed to promote implementation of, CHP units in capacities suitable for residential, commercial, and industrial users.
- Leveraging of attractive financing arrangements, tax benefits such as the existing sales and use tax incentive for machinery and equipment used for cogeneration facilities (RCW 82.08.02565 and RCW 82.12.02565), and other incentives to promote CHP technologies.
- Simplify and standardize permitting for industrial and large commercial CHP systems. Support County and city land use prescreening efforts to support siting.
- Encourage increasing overall on-site energy efficiency through CHP and use of waste heat.

- Implement State Policy that all new non-renewable energy electrical energy generation power plants in WA State must be CHP plants.
- Address lack of funding for design of CHP and waste heat utilization systems associated with state facilities and university campuses
- Encourage capture of waste heat from power generation and industrial processes for use in homes and commercial buildings. Opportunities to recover ("recycle") thermal energy from local waste heat or renewable energy sources include recovery of waste heat from power generation (through combined heat and power or CHP), industrial processes, or municipal operations, and tapping local renewable resources such as bio-energy, geothermal and natural sources of air conditioning such as cold lake or ocean water. District energy systems provide the infrastructure for conveying this energy from the sources to energy consumers.

Potential supporting measures for this option include training/certification of installers/contractors, net metering and other pricing arrangements, establishment of clear, and consistent interconnection standards, and creation/support of markets for biomass fuels.

Elements of this option related to waste heat recycling could include establishing a Washington State inventory of waste heat resources, evaluating the full renewable thermal energy potential in the State, providing incentives for new or existing waste heat generators to (re)locate adjacent or close by to heat users, provide information/education/outreach programs to address barriers to district energy development, and provide financial incentives to implement district energy, waste heat recovery and renewable thermal energy systems through a variety of programs.

6.3 Enhance and Expand Thermal Energy Infrastructure for GHG Emissions Reduction

This option would focus on encouraging the building of thermal energy infrastructure to allow the more efficient use of fuel for heating, cooling, and power generation through creation and expansion of district energy (heating and cooling) systems, and through the institution of district-level planning in general for combined energy infrastructure.

6.4 Smart Electrical Grid

This option, which could be placed in section 5, above, as well as this section, relates to the creation of a "smart electrical grid" that accommodates functions such as interconnection of distributed power generation, plugging in hybrid cars (for charging and/or sending power to the grid from vehicle-based power sources), and electricity demand management via the grid, among many other functions. Possibly also included here include issues related to ownership of distributed generation—municipal PV ownership, or ownership by third parties, for example. This option spans at least the RCI and Energy Supply TWGs, and likely others (including transport and land use) as well. Several utilities in Washington are currently collaborating on developing pilot tests of "smart grid" concepts and technologies.

RCI-7 CUSTOMER-SITED DISTRIBUTED ENERGY AND COMBINED HEAT AND POWER

7.1 GHG Cap and Trade Program (for RCI Sectors)

A cap-and-trade system is a market mechanism in which GHG emissions are limited or capped at a specified level, and capped entities can trade permits (a permit is an allowance to emit one ton of CO_2e). In principle, trading lowers the overall costs of meeting a given emission target, as participants with lower costs of compliance can choose to over-comply and sell their additional reductions to participants for whom compliance costs are higher.

Among the important considerations with respect to a cap-and-trade program are: the sources and sectors to which it would apply ("upstream" at the fuel extraction or import level vs. "downstream" at points of fuel consumption); whether electricity is dealt with from a load-based or generation-based perspective; the level and timing of the cap; how allowances would be distributed (e.g. via grandfathering and/or auctioning) and how new market entrants would be accommodated; what, if any, offsets would be allowed; over what region the program would be implemented (e.g., nationally, regionally, etc.), and potential "leakage" for sub-national programs; which GHGs are covered; whether price caps (e.g. safety valves) are included; whether there is linkage to other trading programs; whether banking and/or borrowing among time periods is allowed; early reduction credit; what, if any, incentive opportunities may be included; use of any revenue accrued from permit auctions; the impacts of cap-and-trade programs on different sectors and consumers; recognition of the "carbon neutrality" of biomass; and provisions for encouraging energy efficiency, if relevant. The principal example of a GHG cap-and-trade system in the US is the Northeast States' Regional Greenhouse Gas Initiative: http://www.rggi.org/. For the RCI sectors, a Cap and Trade program may be considered primarily for large (usually industrial) sources of greenhouse gases, or may include other sectors as well.

7.2 GHG or Carbon Tax

A carbon or GHG tax is typically a tax on each ton of CO_2 or CO_2e emitted from an emissions source covered by the tax. A GHG tax could be imposed upstream based on the carbon content of fuels (for example, imposed at the level of fossil fuel or electricity suppliers) or at the point of combustion and emission (this approach would typically be applied for large point sources of emissions such as large industrial plants). Taxed entities may pass some or all of the cost on to consumers, change production processes to lower emissions, or a combination of the two. As the suppliers respond to the tax, consumers would see the implicit cost of GHG emissions in products and services, and could adjust their behavior to purchase substitute goods and services that result in lower GHG emissions. GHG tax revenue could be used in a number of ways, from income tax reduction to policies and programs to support GHG reductions or technology innovation. GHG tax revenue could also be directed to helping the competitiveness of industries or assisting communities or groups most affected by the tax. Carbon taxes have been in place in a number of European countries since the early 1990s.

7.3 Switching to Less Carbon-intensive Fuels

A number of the energy services provided by fuels use in the RCI sectors can be met through the use of different fuels. Prime examples here are water and space heating, as well as industrial process heat, which can be provided by burning coal, oil, gas, biomass, and perhaps hydrogen, or by using electricity or solar heat. Alternatives also exist for air conditioning, where absorption air conditioning units using heat from combustion of fuels or from solar heat can substitute for electric units. Moving to less carbon-intensive fuel/technology combinations in some end uses can be achieved through a combination of promotion and incentive programs, market creation/expansion (for biomass fuels or for equipment not common in the market, for example). Fuel switching covered under this option would be designed to lead to lower overall fuel-cycle GHG emissions.

7.4 Policies and/or Programs Specifically Targeting Non-energy GHG Emissions

GHG emissions from RCI sources not directly associated with energy use include emissions of both major GHGs such as carbon dioxide, but also a number of specialty gases—such as refrigerants, fire retardants, and solvents—that are emitted in relatively small quantities but have proportionately much larger impacts on climate. A combination of voluntary agreements with industries and of new specifications for key equipment can be used to reduce the emissions of process gases that have high global warming potentials (GWP, a measure of the potential impact of different gases on climate in terms of "CO_2-equivalent").

Potential elements of this option include:

- Increased use of blended cement (substituting fly ash or other pozzolans for clinker—the chief ingredient of cement—reduces CO_2 emissions associated with clinker production from limestone).
- Promotion and funding for leak reduction/capture, recovery and recycling of high-GWP process gases.
- Promotion and funding for process changes/optimization that reduce GHG emissions.
- Use of alternative gases (other HFCs, hydrocarbon coolants/refrigerants, etc.) with lower GWPs in key applications.
- Reorganizing production to reduce/use wastes, reduce inputs.
- Support for voluntary programs and public-private partnerships.
- Support DOT and other government agencies' adoption of performance standards as an alternative to more prescriptive standards where applicable--for example, for building materials production processes that emit carbon, base emissions standards on the structural capacity of a product, rather than its mass alone—so manufacturers have the flexibility to shift to more low-energy products and encourage substitution.
- Require cement users (or contractors working under building permits) to have a certain percentage of fly ash or other material in the concrete they pour. This reduces the amount of

cement used. Provide financial and or market incentives to change the way cement is made (for example, where appropriate to switch to environmentally innovative fillers such as sewage.) Another option is to change from prescriptive to performance based mix designs,

7.5 Negotiated/Voluntary Emissions or Energy Savings Agreements

Government agencies could work with industrial and other large users of energy (and/or of process gases that are greenhouse gases) to encourage those organizations to set emissions reduction targets. This option may be implemented through a combination of financial and other incentives, public-private partnerships and agreements, provision of information and technical assistance, and other methods.

Organizations that use large amounts of energy (electricity, gas, or other fuels) and/or are responsible for large volumes of direct greenhouse gas emissions would be encouraged to set and pursue their own emissions reduction targets. The organizations participating in such a program would typically be large industrial plants, although in some cases large commercial or governmental organizations and facilities might also participate. Reductions in greenhouse gas emissions can be achieved in the industrial sector through energy efficiency, process changes, and/or switching to the use of less carbon-intensive fuels to provide key energy services. Providing tools and information for residents, businesses, and communities to inventory GHG emissions, and to use inventory results to set reduction targets, can also be an element of this option (possibly through a Business assistance program).

7.6 Research and Development - Carbon Sequestration and Removal for RCI Energy End-users

This option would encourage research and development on methods of carbon sequestration and removal associated with systems for RCI energy users. An example of such a system currently in the testing and commercialization phase is a downdraft gasifier technology that converts biomass into a combustible gas, and also captures carbon in the form of activated carbon. Such a system is being developed and built in Prosser, Washington for the FruitSmart Company. Burning the biomass-derived gas produced by the gasifier reduces the need for standard fossil fuels, and the activated carbon from the process can be used to create other value added products. Potential applications of activated carbon particularly relevant to the reduction of greenhouse gas emissions included pre-treatment of landfill gas and methane-rich gas from wastewater treatment systems to produce a fuel suitable fore use in combustion turbines, use as a "biochar" soil amendment[9], or in the EPRIDA[10] process of combining activated carbon and ammonia to

[9] See, for example, the see Cornell University study on "Terra Preta", of which http://www.css.cornell.edu/faculty/lehmann/biochar/Biochar_home.htm and http://www.georgiaitp.org/carbon/PDF%20Files/CSteinerpres.pdf provide brief summaries.

[10] EPRIDA stands for "Earth . People . Research . Innovation . Development . Acknowledgement". See, for example, http://www.eprida.com/home/index.php4, or

remove additional CO_2 from fossil fuel exhaust to create ammonium bicarbonate for use as a value-added soil enhancement/fertilizer.

7.7 Identify GHG Emissions Impacts and Measures to Avoid, Minimize, or Mitigate them for Projects Requiring Government Review

This option would require SEPA review to quantify GHG emissions and identify measures to avoid, minimize or mitigate emissions for:

- All state-funded or proposed projects
- Privately-funded projects that require a state air quality permit
- Privately-funded projects that result in more than 3000 vehicle-mile trips/year.

A similar requirement has recently been put in place in Massachusetts[11].

The review of the energy intensity of the production of building materials used in projects could also be a part of the program, in order to provide incentives for use of low greenhouse gas building products.

7.8 Identify GHG Emissions Impacts and Measures to Avoid, Minimize, or Mitigate them in Designing Rules and Regulations

This option would require an identification of the net impacts on GHG emissions of new government rules and regulations, and would require the identification measures to avoid, minimize or mitigate increases in emissions due to the implementation of those rules and regulations.

RCI-8 PRODUCT CONSUMPTION AND DISPOSAL PRACTICES FOR REDUCED GHG EMISSIONS

8.1 Appliance and Lighting Product Recycling and Design

The overall goal this option is to reduce the life-cycle greenhouse gas (and other) emissions "footprint" of products and their packaging. This option would include appliance and lighting products recycling; design issues including inclusion in products of "smart chips", design of products to make them easy to recycling, and designs to improve product longevity. The option could also include:

- Incentives or requirements/standards to reduce packaging and related GHG emissions.

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http://www.eprida.com/hydro/ecoss/presentations/ACS_phil/index_files/v3_document.htm for a more specific description of the carbon capture proposal using "biochar".

[11] See http://www.boston.com/news/local/articles/2007/04/22/mass_steps_up_climate_rules_for_developers/ for a news summary of the MA requirement.

- Incentives for the use of recycled content in new products.
- Incentives for switching to lower-energy manufacturing processes.
- Consideration of "waste-to-fuel" issues in product and packaging design, with the goal of reducing the life-cycle greenhouse gas (and other) emissions "footprint" of products and their packaging by assuring that the product/packaging can be easily converted to a clean-burning fuel (if not reused or recycled) by eliminating impurities.

8.2 Labeling of Embodied Life-cycle Energy and Carbon Content of Products and Buildings

This option would include elements to estimate the embodied life cycle energy use and carbon emissions associated with products and buildings, to label products and buildings being sold so as to provide feedback to consumers on their "carbon footprint", and to encourage the use of lower-carbon products and building materials.